Los Alamos' Terwilliger named American Crystallographic Association president

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LOS ALAMOS, N.M., April 27, 2016—Tom Terwilliger, the developer of software enabling clear X-ray imaging of protein molecules, is the 2016 President of the American Crystallographic Association. The ACA is the home to more than 1,000 scientists around the country who use X-rays, neutrons and electrons to see the shapes of molecules.

"This is an exciting time for crystallography because there are new ways to look at the structures of molecules using X-ray lasers and new methods for obtaining clear pictures of molecules," said Terwilliger of Los Alamos National Laboratory's Biosecurity and Public Health group. "I look forward to leading the American Crystallographic Association."

The Laboratory does X-ray (and neutron) crystallography in support of its national security mission to counter emerging threats and to strengthen energy security. Terwilliger's research includes developing new methods for interpreting X-ray data so that researchers such as scientists in pharmaceutical companies can see their new drugs bound to protein molecules quickly and accurately. His work also determines the structures of protein molecules such as bacterial machines that pump antibiotics out of the cells and contribute to antibiotic resistance.

Many members of the ACA look at the shapes of protein molecules, which are the molecular machines of life. There are thousands of different kinds of protein molecules that control when cells divide or grow, synthesize chemicals, pump chemicals into and out of cells, help cells communicate with others, and perform many other functions. Scientists use X-rays to see how protein molecules work, how they interact with others and how pharmaceutical drugs can bind to them and turn them on and off. To do this, researchers grow crystals of protein molecules and view them with X-rays, a technique called X-ray crystallography. A crystal of a protein consists of many copies of the protein, all in the same orientation. Having these copies and using X-rays to look at them all together helps give a clear picture of a single molecule.

Other scientists in the ACA use X-rays to see the shapes of synthetic chemicals, such as new drugs. An image of the molecular shape can reveal whether the drug has been made correctly and can help researchers figure out how the drug may bind to a protein molecule.

The members of ACA meet annually. At this year's meeting in Denver, Co. in July, scientists will present what they have learned during the past year and network with their peers.

About Terwilliger

Harvard-educated Terwilliger was elected vice-president of the ACA in 2015 and will serve as president in 2016 and past-president in 2017. Terwilliger is a Los Alamos National Laboratory Fellow and a fellow of the ACA. He has received the ACA's Trueblood Award for his development of software used worldwide, which allows scientists to see a clear picture of a protein molecule in a crystal using X-rays.